



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/611,955	07/06/2000	Cyprian Emeka Uzoh	F19-97-205B	6678

32074 7590 05/29/2003

INTERNATIONAL BUSINESS MACHINES CORPORATION  
DEPT. 18G  
BLDG. 300-482  
2070 ROUTE 52  
HOPEWELL JUNCTION, NY 12533

EXAMINER

VU, HUNG K

ART UNIT	PAPER NUMBER
----------	--------------

2811

DATE MAILED: 05/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/611,955

Applicant(s)

UZOH ET AL.

Examiner

Hung K. Vu

Art Unit

2811



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 25-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the electrical insulating layer located over at least one major surface and in recesses, as recited in claim 25, must be shown or the feature(s) canceled from the claim(s). Note that Figure 3 shows recesses 2 located in the insulating layer 3, not an insulating layer 3 located in the recesses 2. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The amendment filed 12/23/02 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: recesses 2 are formed in at least one major surface of the semiconductor substrate.

Applicant is required to cancel the new matter in the reply to this Office Action.

### ***Claim Objections***

3. Claims 25 and 31-32 are objected to because of the following informalities:

In claim 25, line 2, "in" should be changed to "on" for clarity. Note that the specification, at page 7, lines 16-18, and page 13, lines 2-4, only describes recesses located on at least one major surface of the semiconductor substrate.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 25-32 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The limitations ("a conductive barrier located over said insulating layer in said recess and over said at least one major surface" and "a conductive metal in said recess only"), as recited in claim 25, are not supported by the original specification and/or drawings. Note that Figure 3 shows the conductive barrier (4) located over the insulating layer (3) in recess and over at least one major surface, but does not show the conductive metal (8) is in recess only. Figure 4, on the other hand, shows the conductive metal (8) in recess only and the conductive barrier (4) located over the insulating layer (3) in recess, but does not show the conductive barrier (4) located over at least one major surface. Also note that Figure 3 is an intermediate structure, while Figure 4 is a final structure.

*Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 25, 28-29 and 31-32, insofar as in compliance with 35 USC 112, are rejected under 35 U.S.C. 102(e) as being anticipated by Jain (PN 5,821,168, of record).

Jain discloses, as shown in Figure 10, a semiconductor structure comprising,

a semiconductor substrate (12);

recess (72) located on at least one major surface of the semiconductor substrate;

electrical insulating layer (56) located over the at least one major surface and in the recesses;

a conductive barrier (not shown, Col. 5, lines 38-43) located over the insulating layer in the recess;

a seed layer (60 then became part of 74) located over the conductive barrier within the recess only;

a conductive metal (62 then became part of 74) in the recess only. Note that at the final structure, the seed layer and the conductive metal layer (74) is in recess only.

With regard to claim 28, Jain discloses the seed layer is copper (Col. 4, line 14).

With regard to claim 29, the term “sputtered” is method recitation in a device claimed, and it is non-limiting, because only the final product is relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

With regard to claim 31, Jain discloses the conductive metal is copper (Col. 4, lines 28-29).

With regard to claim 32, Jain discloses the conductive metal is about 6,000Å to 15,000Å thick (within the range of 4,000Å to 30,000Å thick) (Col. 4, lines 28-29).

### ***Response to Arguments***

6. Applicant's arguments filed 10/19/01 have been fully considered but they are not persuasive.

It is argued, at page 5 of the Remarks, that Figure 3 shows a recess 2 in at least one major surface of a substrate 13, and insulating layer 3 located over the major surface and in the recess 2. This argument is not convincing because Figure 3 only shows recess 2 on at least one major surface of a substrate 13, insulating layer 3 located over the major surface of the substrate, and the recess 2 is in the insulating layer, not insulating layer 3 in the recess 2.

Art Unit: 2811

It is argued, at page 6 of the Remarks, that Figure 7 of Jain does not disclose the seed layer is located only in recess and a conductive metal 8 in the recess 2 only. This argument is not convincing due to above USC 112, first paragraph. Further Jain discloses, as shown in Figure 10, the final structure whereby the seed layer and copper layer (74) is formed in recess, therefore, it is inherent that the seed layer is located in recess only. Note that Figure 3 of the claimed invention shows the conductive barrier (4) located over the insulating layer (3) in recess and over at least one major surface, but does not show the conductive metal (8) is in recess only. Figure 4 of the claimed invention, on the other hand, shows the conductive metal (8) in recess only and the conductive barrier (4) located over the insulating layer (3) in recess, but does not show the conductive barrier (4) located over at least one major surface. Also note that Figure 3 is an intermediate structure, while Figure 4 is a final structure.

### *Conclusion*

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2811

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 7:00-4:30, alternate Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

May 19, 2003

Steven Loke  
Primary Examiner

